DESCRIPTION

CHAIR

<Technical Field>

The invention of this application relates to a chair.

<Background Art>

As one type of the chairs, there is the swivel chair whose seat is horizontally revolved. There are some swivel chairs that have the backrest and others that do not have the backrest. In the swivel chair with the backrest, normally a planar shape of the seat is formed as an almost square and, for example, the office chair is suitable for long sitting hours. Also, because of the presence of the backrest, the relative planar posture of the user to the chair can always be kept constant when the user sits on the chair. Many of the swivel chairs with the backrest are also equipped with the armrest.

In the prior art, improvement in the sitting feeling is a major problem in the swivel chair without the backrest as well as the swivel chair with the backrest. The chair manufacturers pay special attention to the development of the chair structure that does not make the user tired while such user sits on this chair for a long time. It is of course important that the chair is comfortable to sit on. Accordingly, it is quite appropriate that the development resources are assigned to the improvement in the sitting feeling, and the meaning is not lost even now.

Meanwhile, in Patent Literature 1 (JP-A-10-215978), it is set forth that the resting tool on which the seated person can rest both arms and against which the seated person can lean forwardly is arranged to swing horizontally. According to this configuration of this Literature, when the seated person is tired from the deskwork such as the operation of the personal computer, or the like,

such seated person can take a rest while leaning against the resting tool that has been turned to the front side of the seated person.

<Disclosure of the Invention>

<Problems that the Invention is to Solve>

By the way, a large transformation in people's working style occurred recently. More particularly, the spread of the free address system (non-territorial system) where an individual has no private desk and chair in the office, the circulation of the project system where a group pursues a project at meetings, the development of the personalization/smaller scale exemplified in SOHO (small office, home office), the progress of the network system business category where individuals in the same profession meet frequently to promote a business while working together, the extension of the in-company business establishment where staffs of a company conduct independent businesses in the company, and the like occurred.

There is a trend toward the respect for individual liberty in the background to such transformation in people's working style. A human power of creation can be heightened by an interaction of the respect for individual freedom with the deepening of communication, and it is as a result understood that both the worker's satisfaction and the productivity can be enhanced. Then, in order to either increase the degree of personal freedom or deepen the communication, the free relaxed atmosphere is needed.

The chair is the furniture that touches the worker's body. But it is possible to say that, in the prior art, the chair used in the non-family case such as the office, or the like has seldom been developed from the viewpoint that such chair contributes to a creation of an atmosphere of freedom. Also, it is possible to say that, the novelty or variety of motion and the novelty of design, which

allows the user to use the chair in a playful spirit, may be mentioned as conditions necessary for the chair that can contribute to a creation of an atmosphere of freedom.

On the contrary, when the person holds the meeting, the conference, or the like in the office, or the like, it is common that such person uses the materials, and the like. Therefore, it becomes a problem where these materials, etc. should be placed. The person can relax and take a rest on the chair set forth in above Literature. But such a problem arises that, when the person intends to hold the meeting, or the like by using this chair, such chair lacks in versatility because a desk on which articles such as the materials should be put is needed separately.

The invention of this application has been made to improve such existing circumstances.

<Means for Solving the Problems>

A chair of the invention of this application, includes a seat on which a person sits; an almost plate-like back support having a supporting surface against which a seated person is able to lean a back; and a back frame to which the back support is fitted via a portion that is different from the supporting surface.

Then, the back support is fitted to the back frame in a condition that at least one motion out of a first motion by which the back support is turned around an axis that extends in a direction to pass through the supporting surface and a second motion by which the back support is turned from a fallen position in which the supporting surface is directed forward to a horizontal position in which the supporting surface is directed just upward is allowed.

In the invention of this application, both the first motion and the second

motion provided to the back support are a novel motion that the conventional chairs do not possess respectively, and various uses that the chairs do not possess up to now can be offered to the user by these novel motions. For example, when the back support takes the second motion, the back support can be used as the backrest in its fallen position and can be used as the armrest or the small table in its horizontal position. The person who is sitting on the chair with a posture opposing to the back support can "play" by turning the back support while using the first motion. Also, because the back support can be used variously or the novel motions of the back support are funny, this chair can contribute to creation of a relaxed environment.

The invention of this application contains many expanded modes (preferred modes). As one of these modes, the back support is formed into a long and narrow shape that has a lengthwise direction and a widthwise direction when viewed from a direction facing to the supporting surface, and the first motion is given to the back support by fitting the back support to the back frame such that the back support is turned around a fist axis that passes through an almost center portion in the lengthwise direction and the widthwise direction.

Because the back support is formed into an elongated shape, the shape of the back support can be changed to a lengthwise posture and a widthwise posture, for example, according to the first motion. Therefore, when the back support is used as the backrest, the user can select the posture to meet the user's liking or physique. Also, in a situation that the person who is sitting on the chair to face to the back support contacts the belly to the back support or rests the elbow on the back support, the user can rest the belly or the elbow in a natural posture when the back support is set to assume the widthwise posture, and thus convenience in use can be improved.

When the back support can make both the first motion and the second

motion, preferably the using modes of the chair can be increased. The invention of this application contains the structures that permit the back support to take the first motion and the second motion.

More particularly, in this example, a rotary bearing is fitted to an upper end portion of the back frame such that the back support is turned freely from an almost forward posture to an upward posture when viewed from a side, and the back support is fitted to the rotary bearing to turn around axes that extend in a direction to pass through the supporting surface of the back support and extend in a direction to intersect orthogonally with a rotating axis of a joint. Since the joint is rotated vertically only in this structure, the supporting structure of the back support becomes stout.

The reform measure for the sitting mode is also contained in the invention of this application. In this reform measure, the seat is formed into a long and narrow shape that has the lengthwise direction and the widthwise direction when viewed from a top, and the seat is supported by legs to swivel horizontally around an almost center portion in the lengthwise direction and the widthwise direction.

In case the seat has a long and narrow shape when viewed from the top, a relative posture of the seat to the back support is changed when the seat is swiveled horizontally. In other words, not only the posture of the back support can be changed but also the posture of the seat can be changed. As a result, variations of the using mode of the chair are tremendously increased, and thus convenience in use can be much more improved.

While the person is sitting astraddle on the seat, this seated person can put articles on the back support or can rest the elbows on the back support after he or she positions the back support in front of him or her. In this case, because the seat has the long and narrow shape, the person can sit astraddle

on the seat in a relaxed posture. In other words, the user can select naturally either a mode in which the person sits on the chair with his or her knees close or a mode in which the person sits astraddle on the seat with his or her knees apart. As a result, such selection makes it more certain that the back support has a wide variety of using modes.

In one preferable expanded example of the invention of this application, the back frame is supported by a leg column to swivel horizontally, and a swiveling center of the back frame coincides with a center of the leg column, and the seat is supported by the leg to swivel horizontally around a position that is deviated from a swiveling center of the back frame in a horizontal direction.

According to this structure, because the back frame can be swiveled horizontally, the seated person can move the back support to any position beside him or her without change of the posture. Also, if a center of the horizontal swiveling motion of the seat agrees with a center of the leg column, it is possible that, because a center of gravity of the seated person is too far from the leg column, the posture of the seated person will become unstable. In this event, a swiveling center of the seat is positioned eccentrically from the leg column, a center of gravity of the seated person can be put as close as possible to the leg column. As a result, stability of the chair can be improved.

In another expanded example of the invention of this application, the chair further includes an intermediate supporting member provided to an upper end of the leg column to swivel horizontally; where the back frame is fixed to the intermediate supporting member and also the seat is fitted to a portion, which is deviated from the leg column to an outside when viewed from the top, of the intermediate supporting member to swivel horizontally. Since the back frame and the seat are fitted to the common intermediate supporting member, an overall structure of the chair can be simplified.

In still another expanded example of the invention of this application, a planar shape of the seat and an outer shape of the supporting surface of the back support are formed into a bottle gourd shape, a middle portion of which in the lengthwise direction is formed to constitute a narrow portion having a narrowest width and an incomplete circular portion is connected to both sides of the narrow portion, respectively.

<Brief Description of the Drawings>

FIG.1(A) is a front view of a chair according to a first embodiment, and FIG.1(B) is a right side view of the chair according to the first embodiment.

FIG.2 is a plan view of the chair according to the first embodiment.

FIG.3 is a sectional view viewed from a III-III line in FIG.2.

FIG.4 is an exploded perspective view of a seat receiver portion.

FIG.5 is an exploded plan view of the seat receiver portion.

FIG.6 is a partially broken plan view of the seat receiver portion.

FIG.7 is a partially broken separated side view of the seat receiver portion.

FIG.8(A) is a sectional view viewed from a VIIIA-VIIIA line in FIG.6, FIG.8(B) is a sectional view viewed from a B-B line in FIG.8(A), FIG.8(C) is a sectional view showing a motion of a lever, FIG.8(D) is a sectional view showing another example of a lever holding means, and FIG.8(E) is a plan view of the lever holding means in FIG.8(D).

FIG.9 is an exploded perspective view of a joint unit.

FIG.10 is an exploded plan view of the joint unit.

FIG.11(A) is a plan view of a joint unit, FIG.11(B) is a side view of the joint unit, and FIG.11(C) is a partially broken plan view of the joint unit.

FIG.12(A) is a longitudinal sectional side view of the joint unit, FIG.12(B)

is a sectional view viewed from a B-B line in FIG.12(A), and FIG.12(C) is a sectional view viewed from a C-C line in FIG.12(A).

FIG.13(A) is a longitudinal sectional side view of the joint unit showing a state where a back support cannot be moved to a horizontal position, and FIG.13(B) is a plan view of the chair.

FIG.14(A) is a longitudinal sectional side view when the back support is in its horizontal position, FIG.14(B) is a sectional view viewed from a B-B line in FIG.14(A), and FIG.14(C) is a plan view of the chair.

FIG.15 is a plan view showing using examples of the chair.

FIG.16 is a longitudinal sectional side view of a joint unit according to a second embodiment.

FIG.17(A) is a longitudinal sectional side view of a joint unit according to a third embodiment, and FIG.17(B) is a sectional view viewed from a B-B line in FIG.17(A).

FIG.18 is a longitudinal sectional side view of a joint unit according to a fourth embodiment.

FIG.19(A) is perspective view of a joint unit according to a fifth embodiment, and FIG.19(B) is a longitudinal sectional side view of the joint unit according to the fifth embodiment.

<Description of Reference Numerals and Signs>

1 leg column (gas cylinder)

2 leg

3 seat

4 back support

4a narrow portion

4b incomplete circular portion

5 back frame

8 seat receiver portion

9 intermediate supporting body

11 joint unit

12 second axis

13 first axis

37 fixed bearing

38 auxiliary bearing

40 rotary bearing

<Best Mode for Carrying Out the Invention>

(1) Outline of First Embodiment

FIG.1 to FIG.15 show a first embodiment. First, an outline of a chair will be explained with reference to FIG.1 and FIG.2 hereunder. The chair includes a leg 2 having a leg column 1, a seat 3 supported by the leg column 1 such that its height can be adjusted, a back support 4 against which the seated person can lean, and a back frame 5 to which the back support 4 is fitted.

The leg 2 has a plurality of branch legs 6 that extend in a radial fashion from the leg column 1 when viewed from the top. A caster 7 is provided to a top end of each branch leg 6. A gas cylinder whose inner and outer cylinders can be fitted mutually to move vertically and rotate relatively is used as the leg column 1. In this example, an elevating cylinder 1a constitutes the inner cylinder, and an outer cylinder 1b constitutes the fixed cylinder.

A seat receiver portion 8 is provided between the leg column 1 and the seat 3. The seat receiver portion 8 has an intermediate supporting body (seat receiver base) 9 that is opened upwardly. A planar shape of the intermediate supporting body 9 is formed into a teardrop shape whose width dimension is

increased gradually from one end portion to the other end while rounding as a whole. Also, the intermediate supporting body 9 constitutes a cubic boat shape both end portions of which are inclined when viewed from the side while curving when viewed from the front. Also, the intermediate supporting body 9 is fixed to an upper end of the elevating cylinder 1a at a portion located near the narrow end portion. Also, a lever 10 used to move the seat 3 up and down is exposed from the outside of the intermediate supporting body 9.

As shown in FIG.2, a planar shape of the seat 3 is prolonged in one direction while rounding as a whole. More particularly, the planar shape of the seat 3 constitutes a bottle gourd shape consisting of a narrow portion 3a and incomplete circular portions 3b extended on both sides of the narrow portion 3a. Also, as shown in FIG.2, the seat 3 is fitted rotatably to a portion, which is deviated from the leg column 1 when viewed from the top, of the intermediate supporting body 9.

The back frame 5 is formed into an L-shape that has a horizontal portion 5a at its lower end. The horizontal portion 5a is fixed to a rear portion of the intermediate supporting body 9 by the welding. Also, a rising portion of the back frame 5 is positioned on the outer side of a swiveling area of the seat 3. Therefore, the seat 3 can be swiveled around and around irrespective of a position of the back frame 5. In other words, the seat 3 and the back frame 5 can be relatively swiveled arbitrarily. A hollow circle is selected as a cross sectional shape of the back frame 5, but other sectional shape such as a hollow square, a hollow ellipse, or the like may be selected.

The back support 4 is an almost plate shape a thickness of which is extremely smaller that an area, and has an almost flat supporting surface 4' against which the seated person leans. An outer shape of the supporting surface 4' is prolonged in one direction while rounding as a whole. More

particularly, like the seat 3, the outer shape of the supporting surface 4' constitutes a shape (bottle gourd shape) consisting of a narrow portion 4a and incomplete circular portions 4b extended on both sides. The back support 4 is set smaller in size than the seat 3, but they may of course be set in almost same size.

The back support 4 is fitted to an upper end portion of the back frame 5 via a joint unit 11. Also, the back support 4 can be turned around a second axis 12 from a fallen position in which the supporting surface 4' is directed forward, as indicated by a solid line in FIG.1(A), to a horizontal position in which the supporting surface 4' is directed upward, as indicated by a dot-dash line in FIG.1(B) and FIG.2. Also, the back support 4 can be turned around a first axis 13, which passes through a lengthwise and widthwise middle portion in the thickness direction, in the fallen position.

A motion of the back support 4 to turn around the first axis 13 is a first motion, and a motion of the back support 4 to turn around the second axis 12 is a second motion. The back support 4 when viewed from the front can assume a lengthwise posture or a widthwise posture according to the first motion. Also, the back support 4 when viewed from the side can change its posture from the fallen position in which the supporting surface 4' is directed forward to the horizontal position in which the supporting surface 4' is directed upward according to the second motion. The back support 4 adopts a posture that leans slightly backward in the fallen position.

In this specification, the wording "when viewed from the front" and the wording "when viewed from the side" are employed. In this case, the wording "when viewed from the front" means that the chair is viewed from the direction along which the seat 3 is positioned in the near side and the back support 4 is positioned in the back side (in other words, the direction along which the user

faces to the supporting surface 4' in a situation that the back support 4 is fallen down), and the wording "when viewed from the side" means that the chair is viewed from the lateral direction that intersects orthogonally with the direction of the "when viewed from the front" and the direction of the "when viewed from the top".

Next, details of respective portions will be explained hereunder.

(2) Details of the Seat Receiver Portion

First, details of the seat receiver portion 8 will be explained with reference to FIG.3 to FIG.8 hereunder. As understood from FIG.3 or FIG.7, for example, a tapered receiving cylinder 14 is secured to the intermediate supporting body 9 and this receiving cylinder 14 is fitted on the upper end portion of the elevating cylinder 1a. The elevating cylinder 1a has a push valve 15 used to switch a free state in which this cylinder 1a can be moved up and down and a lock state in which a vertical movement of this cylinder 1a is inhibited. The push valve 15 is projected from an upper surface of the elevating cylinder 1a. As already described, the elevating cylinder 1a is fitted rotatablly into the outer cylinder 1b. Therefore, the intermediate supporting body 9 and respective members attached thereto can be horizontally swiveled freely around an axis of the elevating cylinder 1a.

A lid-like bracket plate 16 is secured to the intermediate supporting body 9 by the welding. A latter half of the bracket plate 16 constitutes a stepped-down portion 16a that is set lower than a former half. A lever receiver 18 for holding the lever 10 used to operate the push valve 15 of the elevating cylinder 1a is secured to the stepped-down portion 16a by the vis 19. The seat 3 is fitted to the portion, which is distant from the leg column 1, of the bracket plate 16 via a cylinder body 20 to swivel horizontally. That is, the seat 3 is fitted to the intermediate supporting body 9 in a state that the seat 3 is deviated from

the leg column 1 by a certain dimension.

As shown in FIG.3 and FIG.7, for example, the seat 3 has a structure that a cushion 22 is upholstered on a base plate 21 made of the rigid material such as a plywood, or the like. A circular metal (resin) boss member 23 when viewed from the top is fixed to a center portion of a lower surface of the base plate 21. This boss member 23 is fitted turnably into the cylinder body 20 via a bush 24 made of a synthetic resin.

The boss member 23 has a large-diameter portion 23a that is stacked on the bracket plate 16. A flange portion 24a to receive the large-diameter portion 23a of the boss member 23 is formed on an upper end of the bush 24. A plurality of slits 24b opened downward are formed in the bush 24 discretely along the circumferential direction. The boss member 23 has a bottom plate 23b. This boss member 23 can be held upward-undetachably by screwing the vis 25, which passes through the bottom portion of the intermediate supporting body 9 from the bottom, into the bottom plate 23b. An upper surface of the intermediate supporting body 9 is covered with a cover 26 made of a resin.

The lever 10 used for the elevating operation is manufactured by a metal round bar as the material. As shown in FIG.4 or FIG.6, for example, the lever 10 is arranged to extend across the intermediate supporting body 9 when viewed from the top, and both end portions of the lever 10 are passed through the intermediate supporting body 9 and exposed to left and right outer sides of the intermediate supporting body 9. A resin finger pad 27 is attached to the exposed portions of the lever 10. As shown in FIG.4 or FIG.8(A), for example, a portion of the lever 10, which overlaps with the intermediate supporting body 9, is bent like an almost M shape when viewed from the front, and left and right middle portions of the lever 10 constitute a pushing portion 10a against the push valve 15 respectively.

Also, a center engaging groove 28 is formed in a middle area of the portion, which is bent like the almost M shape, of the lever 10 to open upward, and a side engaging groove 29 is formed in portions on both left and right sides respectively to open upward.

Meanwhile, the lever receiver 18 is made of a resin, and has a gutter portion 18a that is tightly fitted into a portion of the lever 10, which is bent like a downward projected ridge form, from the upper side. A center engaging projection 30 and side engaging projections 31, which are fitted into the center engaging groove 28 and the side engaging grooves 29 of the lever 10 respectively, are provided on an upper bottom surface of the gutter portion 18a to project downward respectively.

Since the ridge-like bent portion of the lever 10 is fitted into the lever receiver 18, its posture is restricted and thus the lever 10 cannot be moved around its axis. Also, as understood from FIG.8(C), even when the lever 10 is pushed or pulled in any of upward and downward directions, such lever 10 is moved around any one of the side engaging groove 27 and the side engaging projection 31 acting as a fulcrum, and then the push valve 15 is pushed down.

As shown in FIG.4, for example, a notch 32 to prevent an interference with the lever 10 is formed in the bracket plate 16. Also, holes 33 of the intermediate supporting body 9 through which the lever 10 is passed are formed as an elongated hole, which is prolonged in the vertical direction to allow the vertical rotation of the lever 10, respectively. Also, as shown in FIG.4, a relief hole 18b to avoid an interference with the elevating cylinder 1a is opened in the flat plate portion of the lever receiver 18.

In the present embodiment, the lever receiver 18 and the lever 10 can be positioned exactly by fitting the bent portion of the lever 10 into the lever receiver 18. Then, the lever 10 can be fitted simply only when the lever receiver 18 is

fixing to the bracket plate 16 by the vis 19 in this state.

Also, even when the lever 10 is moved in either of the upward and downward directions, the side engaging groove 29 and the side engaging projection 31 acting as a turning fulcrum are tightly fitted together. Therefore, there is no disadvantage that the lever 10 is disengaged from the lever receiver 18.

In this case, the center engaging groove 28 and the center engaging projection 30 are not always needed. Also, the engaging projection may be formed on the lever 10 and the engaging groove may be formed in the lever receiver 18. In addition, the lever receiver 18 may be formed of metal. Also, from viewpoints of the convenience in handling and the insurance of assemble accuracy, it is preferable that the lever receiver 18 should be formed as an integral structure like the present embodiment. But the lever 10 can be held by separate lever receivers at two locations.

FIGS.8(D)(E) show another example of the fitting structure of the lever 10. In this example, the basic modes of the lever 10 and the lever receiver 18 are identical to those already described. But this example has such a feature that, as a means for preventing the disengagement of the lever 10, projections 34 projected outward when viewed from the top are provided to both end portions of the lever 10 exposed from the lever receiver 18 by the extrusion. Therefore, pairs of the grooves 28, 29 and the projections 30, 31 provided in the foregoing example are not provided. As a result, this fitting structure is excellent in strength and the machining is made simple.

(3) Fitting Structure of the Back Support

Next, a fitting structure of the back support 4 will be explained in detail with reference to FIG.9 to FIG.14 hereunder. As shown in FIG.9, for example, the back support 4 has such a structure that a cushion 36 is put on a base plate

35 made of the rigid material such as the plywood, or the like. In this case, either the structure in which a cloth, or the like is spread on the base plate 35 or the structure constructed only by the base plate 35 may be employed.

As understood from FIG.9, for example, the joint unit 11 has a fixed bearing 37 fixed to an upper end of the back frame 5, an auxiliary bearing 38 fitted onto the fixed bearing 37, a rotary bearing (body of rotation) 40 fitted rotatably to the fixed bearing 37 and the auxiliary bearing 38 by a horizontal supporting shaft 39, a lock pin 41 built in the rotary bearing 40, a spring (compression coil spring) 42 for energizing the lock pin 41, and a supporting plate 43 fixed to the back support 4.

In the present embodiment, an axis of the supporting shaft 39 serves as the second axis 12 and an axis of the lock pin 41 serves as the first axis 13. The second axis 12 embodied by the supporting shaft 39 extends horizontally in vicinity of a center portion of the back surface of the back support 4, and its extending direction is set almost parallel with a tangential direction to the seat 3 when viewed from the top.

The fixed bearing 37 has a downward boss portion 37a, and the boss portion 37a is fixed to the back frame 5 by the vis 44. Also, an upper portion of the fixed bearing 37 is shaped into a plate portion 37b that has a virtual outer shape like a circular plate. A cut-opened portion 45 opened toward the opposite side to the seat 3 is formed in the plate portion 37b. The cut-opened portion 45 is expanded in a range of an almost 90 degree.

The auxiliary bearing 38 has two sheets of circular plate portions 38a that are stacked on the plate portion 37b of the fixed bearing 37 respectively. Two sheets of circular plate portions 38a are coupled integrally via a coupling portion 38b that is fitted in the cut-opened portion 45 of the fixed bearing 37. Then, as can be seen easily from FIG.12, an outer diameter of the coupling

portion 38b of the auxiliary bearing 38 is set smaller than a virtual outer peripheral surface of the plate portion 37b of the fixed bearing 37. Also, a stepped portion 38c opened upward is formed on an upper end of the coupling portion 38b of the auxiliary bearing 38.

Therefore, an engaging hole 46 opened upwardly is formed by cooperative actions of the cut-opened portion 45 of the fixed bearing 37 and the coupling portion 38b of the auxiliary bearing 38. As shown in FIG.10, for example, the engaging hole 46 is shaped into a rectangle such that, when viewed from the top, a grove width W1 in the lateral direction (axial direction of the supporting shaft 39) is set larger than a groove width W2 in the longitudinal direction. Here, the engaging hole 46 can be formed directly in the fixed bearing 37. In this case, the auxiliary bearing 38 can be omitted.

The rotary bearing 40 is formed cylindrically as a whole, and its front end portion is shaped into a forked portion 40a that is bored to be fitted into the plate portion 37b of the fixed bearing 37 and the auxiliary bearing 38. Also, the forked portion 40a is fitted to the fixed bearing 37 and the auxiliary bearing 38 by the supporting shaft 39. In the present embodiment, a bolt is used as the supporting shaft 39 and the supporting shaft 39 is held unreleasably by a nut 47. In this case, the nut 47 is held on the rotary bearing 40 not to rotate.

The lock pin 41 is formed to have different diameters such that the front side has a large diameter, and an engaging projection 48 having an almost rectangular sectional shape is formed on the front end portion. The lock pin 41 is fitted into the rotary bearing 40 to rotate but not to release backwardly. Therefore, a hole 49 formed in the rotary bearing 40 is also formed to have stepped different diameters.

Also, the engaging projection 48 of the lock pin 41 has a rectangular sectional shape, while the engaging hole 46 has also a rectangular shape. A

dimension L of the engaging projection 48 in the longitudinal direction (see FIG.9 and FIG.10) is set slightly smaller than a groove width dimension W1 of the engaging hole 46 in the lengthwise direction but is set larger than a groove width dimension W2 of the engaging hole 46 in the widthwise direction. Therefore, the lock pin 41 when rotated on its axis has either a posture that is fitted into the engaging hole 46 or a posture that is not fitted into the engaging hole 46. The lock pin 41 is pushed toward the fixed bearing 37 by the spring 42 fitted into its small-diameter portion.

A rear end 41a of the lock pin 41 is non-circularly notched, and this rear end 41a is fitted unrotatably into the supporting plate 43. Then, the base plate 35, the supporting plate 43, and the lock pin 41 of the back support 4 are tightened together by the vis 50 in this state. The supporting plate 43 is fixed to the base plate 35 by the vis 51. In this case, the lock pin 41 may be fixed to the supporting plate 43. A cylinder portion 43a for covering the rotary bearing 40 from the outside is formed on the supporting plate 43.

(4) Motion of the Back Support

As can be seen from FIG.12 to FIG.14, a turning angle of the back support 4 around the supporting shaft 39 is regulated by a moving stroke of the engaging projection 48 (a moving range on an axis of the supporting shaft 39) of the lock pin 41. Also, when the back support 4 is in its fallen position, the lock pin 41 can be rotated in the rotary bearing 40 and therefore the back support 4 can be turned freely around the axis of the lock pin 41.

When the back support 4 is in its fallen position, a top end of the engaging projection 48 of the lock pin 41 comes in contact with or comes close to an outer peripheral surface of the coupling portion 38b of the auxiliary bearing 38. In other words, when the back support 4 is in its fallen position, the lock pin 41 goes back against the spring 42 in the direction to come out of the rotary

bearing 40. For this reason, it is impossible basically to move the back support 4 in an axial direction of the lock pin 41.

The engaging projection 48 of the lock pin 41 can be fitted into the engaging hole 46 only when it assumes a posture that extends long in parallel with the axial line of the supporting shaft 39 (i.e., a widthwise posture when viewed from the front). In a situation that the engaging projection 48 is not in the posture that extends long in parallel with the supporting shaft 39, as shown in FIG.13, the engaging projection 48 of the lock pin 41 stretches over the engaging hole 46 when the back support 4 is set upright, so that it is impossible to move the back support 4 to its horizontal position.

On the contrary, as shown in FIG.14, when the engaging projection 48 of the lock pin 41 assumes the posture that is in parallel with the axial line of the supporting shaft 39 (i.e., the widthwise posture when viewed from the front), the engaging projection 48 is fitted in the engaging hole 46, so that the back support 4 can move to its horizontal position.

Then, the engaging projection 48 of the lock pin 41 has a rectangular sectional shape that extends in the same direction as the longitudinal direction of the back support 4. Therefore, as shown in FIG.14, it is impossible to move the back support 4 to its horizontal position unless the back support 4 is in a posture that extends long in the tangential direction to the seat 3 when viewed from the top. In other words, it is impossible to move the back support 4 from its fallen position to its horizontal position until the back support 4 is set in the widthwise posture.

When the back support 4 assumes the posture that extends long in the tangential direction to the seat 3 when viewed from the top, such back support 4 is within an area in which the back support 4 can be supported stably by the leg 2 (i.e., an area produced by connecting the casters 7). Therefore, the chair

never falls down even when a large load is applied to any portion of the back support 4.

In contrast, as shown in FIG.13(B), when the back support 4 is set horizontally at a posture that extends long in the radial direction of the seat 3 when viewed from the top, an end portion of the back support 4 gets out of a stable supporting area of the leg 2. As a result, it is possible that the chair falls down when the large load is applied to the end portion of the back support 4. However, such situation can be avoided in the present embodiment.

Since the lock pin 41 is fitted into the engaging hole 46 by a pushing action of the spring 42 in a state that the back support 4 is in its horizontal position, the back support 4 is held not to fall/turn and not to swivel horizontally. Then, when the back support 4 is lifted from its horizontal position against the spring 42, the fitting of the lock pin 41 into the engaging hole 46 is released, so that the back support 4 can be turned to the fallen position.

Fitting/unfitting actions of the lock pin 41into/from the engaging hole 46 are classified into a turn regulating function of allowing the back support 4 to move to the horizontal position only when such back support 4 assumes the widthwise posture when viewed from the front, a fall-preventing locking function of holding the back support 4 in its horizontal position not to fall down, and a horizontal turn preventing function of holding the back support 4 in its horizontal position not to turn horizontally. As the means for attaining these three functions, a turn regulating means, a fall-preventing locking means, and a horizontal turn preventing means are needed. In the present embodiment, one structure is used commonly as three means, but these three means can be provided by individual structures.

As can be grasped from FIG.12(A), FIG.13(A), and FIG.14(A), the cut-opened portion 45 of the fixed bearing 37 is hidden by the forked portion 40a

of the rotary bearing 40 irrespective of the posture of the back support 4. Therefore, the cut-opened portion never catches the user's finger.

In this case, the materials of the bearings 37, 38, 40 are not particularly limited and, for example, these bearings can be made of a resin, a metal die casting, or the like. The bolt may not be used as the supporting shaft 39, and the pin may be used and locked by the snap ring, or the like. The back support 4 can be fallen down up to the vertical position when viewed from the side. When the back support 4 is used to function as the backrest, it is possible that preferably the back support 4 should be fallen down to lean backward at a slight angle like the present invention.

(5) Examples of Using Modes of the Chair

The above chair can be used in various modes. First, the seat 3 has three using modes, i.e., A. the user sits on the chair in its widthwise posture, B. the user sits on the chair in its lengthwise posture, and C. the user sits on the chair in its widthwise posture to put left and right shanks on the upper surface of the seat while bending both knees.

Meanwhile, the back support 4 has six using modes, i.e., a. the back support is positioned at the back of the seated person in its fallen position, b. the back support is positioned on the side of the breast of the seated person in its fallen position, c. the back support is positioned on the right side or the left side of the seated person in its fallen position, d. the back support is positioned at the back of the seated person in its horizontal position, e. the back support is positioned in front of the seated person in its horizontal position, and f. the back support is positioned right or left at side of the seated person in its horizontal position.

Then, the person can use in various modes based on combinations of using modes A to C of the seat 3 and using modes a to f of the back support 4.

The back support 4 functions mainly as the backrest in a state that the back support 4 is set to the fallen position.

By the way, sometimes the person wishes to relax by leaning largely the body while the person is using the chair. In this respect, because both the seat 3 and the back support 4 have an elongated shape in the present embodiment, the user can lean largely the upper half of his or her body after the seat 3 is set to the lengthwise posture and the back support 4 is set to the longitudinal posture vertically and then the sitting point is put on the front side of the seat 3. Also, because the back support 4 has a long and narrow shape, the seated person can put one arm on the upper surface of the back support 4 while holding the back to the back support 4 when the back support 4 is set in the lengthwise posture.

Several examples of the using mode in a state that the back support 4 is set in its horizontal position are shown in FIG.15. In this case, in FIG.15, the back support 4 is depicted in the almost same size as the seat 3. In the using example shown in FIG.15(A), the back support 4 is arranged in parallel with the seat 3 and the person sits on the chair to put the back on the end surface of the back support 4. That is, the back support 4 is used as the backrest. Because the narrow portion 4a exists in the back support 4, the backbone of the seated person never contacts the back support 4 and therefore the user can use the back support 4 without an uncomfortable feeling. Also, as indicated by a dot-dash line, the user can lean the back support 4 in its horizontal position and also the user can put both elbows or one elbow behind him or her and put them or it on the back support 4. In other words, the user can use the back support 4 as both uses of the backrest and the armrest simultaneously.

In the example shown in FIG.15(B), the seated person puts the back support 4 by his or her side and then uses the back support 4 as the armrest.

When the person uses the back support 4 as the armrest, such person can position the back support 4 in front of the seated person and can put both elbows on the back support 4.

In FIGS.15(C) to 15(E), an example where the back support 4 is used as a small table is shown. That is, the user can take a note on the back support 4 or can put the documents, the notebook computer, or the like on the back support 4. In FIG.15(E), the person sits astraddle on the seat 3. Because the seat 3 has the narrow portion 3a, the seated person can stretch easily his or her left and right legs and therefore the user can sits astraddle on the seat 3 in a relaxed posture.

In the example shown in FIG.15(F), the back support 4 assumes the posture that extends long in front of the seated person (as described above, this using mode cannot be employed in the first embodiment). In this case, the back support 4 can be used as both the small table and the armrest. When the back support 4 is set in its horizontal position while the person does not sit on the chair, the user can use both the seat 3 and the back support 4 as a material loading table.

(6) Second Embodiment (FIG.16)

FIG.16 shows a second embodiment. This embodiment is a variation of the back support fitting structure in the first embodiment.

In this second embodiment, a reinforcing member 53 is fixed to a top end surface of the rotary bearing 40 by screws 54. The reinforcing member 53 is fitted slidably into a hole 55 formed on the base plate 35 of the back support 4. Also, the reinforcing member 53 is held unreleasably by the supporting plate 43. In addition, the lock pin 41 is fixed to the base plate 35 of the back support 4 not to rotate.

In this embodiment, there is such an advantage that, because the

reinforcing member 53 is fitted into the hole 55 of the base plate 35, the fitting structure of the back support 4 can be made stouter.

(7) Third Embodiment (FIG.17)

FIG.17 shows a third embodiment. This third embodiment is a variation of the first embodiment, and has a feature in the fitting structure of the back support 4. A difference of the third embodiment from the first embodiment is that the engaging projection 48 of the lock pin 41 is formed to have a circular sectional shape.

In this embodiment, the engaging projection 48 has no directionality when such engaging projection is fitted into the engaging hole 46. Therefore, the back support 4 can be moved to its horizontal position no matter what posture the back support 4 should have in its fallen position when viewed from the front, and also the back support 4 can be turned horizontally in its horizontal position. Such structure may be employed in response to the user's desire.

(8) Fourth Embodiment (FIG.18)

FIG.18 shows a fourth embodiment. This embodiment has a feature in the joint unit 11. A basic structure of the joint unit 11 in this embodiment is common to the first embodiment. However, as a different point from the first embodiment, an aspect that the lock pin 41 is fitted into the rotary bearing 40 not to rotate and an aspect that the back support 4 is fitted to the lock pin 41 to turn can be listed. In this embodiment, there is no constraint in the posture (directionality) when the back support 4 is moved to the fallen position and the horizontal position.

(9) Fifth Embodiment (FIG.19)

FIG.19 shows a fifth embodiment. This embodiment has a feature in the joint unit 11. Like the first embodiment, the joint unit 11 in this embodiment has the fixed bearing 37, the rotary bearing 40, the supporting shaft 31, the lock

pin 41, the spring 42, and the supporting plate 43. However, this joint unit 11 does not have the auxiliary bearing 38 in the first embodiment, and the engaging hole 46 is formed directly in the fixed bearing 37. An aspect that the engaging projection 48 having a rectangular sectional shape is provided in the lock pin 41 is similar to the first embodiment.

Also, the lock pin 41 is held in the base plate 35 of the back support 4 not to release and not to rotate relatively, and also is fitted by the vis 50 to slide within a minute distance in the axial direction. A hook 57 on which the article such as the bag, or the like is put is fitted to the fixed bearing 37.

(10) Others

The invention of this application can be embodied into various modes other than the above embodiments. For example, the seat and the back support are not limited to the bottle gourd and the circle as illustrated. Various shapes such as almost rectangle, ellipse, rectangle whose both ends are formed like a circular arc, polygon, circle, and the like can be set. The seat and the back support can be formed into different shapes. Also, particular structures of the back frame and the joint unit can be embodied variously as the case may be.

In the case where the back support is a circle or a square and the back support can have the first action only, when the back support is fitted such that this back support can be turned around the portion that is deviated from its center portion, a height of the back support can be changed together with its rotation. Also, the user can play by turning the back support round and round. Therefore, when the back support can have the first action only, the back support should not always be shaped into the elongated shape.

Such a structure can be employed that a height of the back support can be adjusted independently, or such a structure can be employed that an interval between the seat and the back support (an interval when viewed from the top)

can be adjusted. The back support can be folded double. Also, the invention of this application can be applied to the chair of the type that the legs are fixed to the floor (i.e., unmovable chair). There is no trouble even if the supporting surface of the back support is slightly uneven or rounded.